

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Koji MATSUKUMA

Application No.: Rule 53(b) Divisional of
Application No. 09/219,707

Filed: Docket No.: 102392.01

For: ETCHING MASK, METHOD OF MAKING SAME, ETCHING METHOD,
MAGNETIC HEAD DEVICE AND METHOD OF MANUFACTURING SAME

PRELIMINARY AMENDMENT

Director of the U.S. Patent and Trademark Office
Washington, D. C. 20231

Sir:

Prior to initial examination, please amend the above-identified application as follows:

IN THE TITLE:

Please delete the original title and insert therefor the following new title: --ETCHING
MASK AND MAGNETIC HEAD DEVICE--.

IN THE CLAIMS:

Please cancel claim 1 without prejudice to or disclaimer of the subject matter
contained therein.

Please add new claims 27-37 as follows:

--27. An etching mask for selectively etching a workpiece, wherein the etching
mask is made of a metal and has a cross-sectional shape comprising a rectangular first region
that determines a pattern width of the workpiece, and a second region that intercepts
application of etching beams to a sidewall of the first region during etching.--

--28. The etching mask according to claim 27, wherein the etching mask has a T-shaped cross section.--

--29. The etching mask according to claim 28, comprising a cross section including a vertical bar having an end that contacts with a surface of the workpiece, and a lateral bar placed on another end of the vertical bar and having a width greater than a width of the vertical bar, wherein a pattern width of the workpiece is determined by the width of the vertical bar.--

--30. The etching mask according to claim 27, comprising a cross section including a vertical bar having an end that contacts with a surface of the workpiece, and a lateral bar placed on another end of the vertical bar and having a width greater than a width of the vertical bar, wherein a pattern width of the workpiece is determined by the width of the vertical bar.--

--31. The etching mask according to claim 28, wherein the metal is selected from the group consisting of NiFe, NiB, NiP, Cu, Au and an alloy comprising one of Co and Ta.--

--32. The etching mask according to claim 27, wherein the metal is selected from the group consisting of NiFe, NiB, NiP, Cu, Au and an alloy comprising one of Co and Ta.--

--33. A magnetic head device, comprising:

an inductive writing head, including:

a first writing pole;

a second writing pole corresponding to the first writing pole;

and

a gap layer between the first writing pole and the second writing pole,

wherein the second writing pole has a rectangular cross section

including a sidewall substantially orthogonal to a surface of the gap layer.--

--34. The magnetic head device according to claim 33, further comprising a magnetoresistive reading head including a magnetoresistive layer between two shield layers, wherein one of the shield layers functions as the first writing pole.--

--35. A magnetic head device, comprising:

an inductive writing head, including:

a first writing pole;

a second writing pole corresponding to the first writing pole;

and

a gap layer between the first writing pole and the second writing pole,

wherein at least part of the first writing pole, the gap layer and the second writing pole have an equal width and each have a rectangular cross section including a sidewall substantially orthogonal to a surface of a base layer.--

--36. A magnetic head device, comprising:

an inductive writing head, including:

a first writing pole;

a second writing pole corresponding to the first writing pole;

and

a gap layer between the first writing pole and the second writing pole,

wherein the gap layer and the first writing pole are formed by dry etching using an etching mask made of a magnetic material and having a T-shaped cross section, and the etching mask is the second writing pole.--

--37. The magnetic head device according to claim 36, further comprising a magnetoresistive reading head including a magnetoresistive layer between two shield layers, wherein one of the shield layers functions as the first writing pole.--

REMARKS

Claims 27-37 are pending. By this Preliminary Amendment, claim 1 is canceled and claims 27-37 are added.

The attached Appendix includes marked-up copies of each rewritten claim (37 C.F.R. 1.121(c)(1)(ii)).

Prompt and favorable examination on the merits are respectfully requested.

Should the Examiner have any questions in this application, the Examiner is requested to contact Applicant's undersigned representative at the telephone number below.

Respectfully submitted,



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Registration No. 27,075

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JAO:EAB/ldg

Attachment:
Appendix

Date: August 6, 2001

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<p>DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461</p>
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APPENDIX

Changes to Title:

The following is a marked-up version of the amended title:

~~ETCHING MASK, METHOD OF MAKING SAME, ETCHING METHOD, MAGNETIC~~
~~HEAD DEVICE AND METHOD OF MANUFACTURING SAME~~ ETCHING MASK AND
MAGNETIC HEAD DEVICE

Changes to Claims:

Claim 1 is canceled.

Claims 27-37 are added.

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